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Heterosis for Yield and Yield Components in OKRA (Abelmoschus Esculentus L.)

K. Jagan[1], K. Ravinder Reddy[2], M. Sujatha[3] V. Sravanthi[4] and S. Madhusudhan Reddy[5]

[1, 2, 4] *Department of Horticulture College of Horticulture, Rajendranagar, APHU, Hyderabad-500030, (A. P.), India*
[3, 5] *Department of Genetics and Plant Breeding, College of Agriculture, Acharya N.G. Ranga Agricultural University, Rajendranagar, Hyderabad-500030, (A. P.), India*

Abstract: *The present investigation was undertaken with the objective of identifying the high yielding parents and F1 hybrids through Line x Tester mating design to estimate the heterosis. The experiment was conducted by raising four lines and fifteen testers as parents and their 60 F1 hybrids during kharif 2009 and spring summer 2010. The heterosis recorded for fruit and its thirteen component characters. The F1 hybrids, Arka Anamika x IC-331217, Arka Abhay x IC-331217, Arka Anamika x IC-326893, Arka Anamika x IC-443670, Arka Abhay x IC-332454 and Arka Abhay x IC-433675 recorded high degree of standered heterosis for yield and its contributing characters. High estimates of heterosis obtain in hybrid combinations revealed considerable genetic divergence among the parental lines.*

Key words: *Heterosis, okra*

I. Introduction

In India, the yield potential of okra is low with straight varieties (10.39 t/ha) shows that there is a wide gap in productivity. The present production is inadequate to meet the requirements of the country for both domestic and export market. Major problem in okra cultivation is lack of high yielding varieties along with local specific and disease tolerant hybrids. Production of varieties with higher yields is better fruit quality and resistance to Yellow vein mosaic virus is universally desired. Of the various approaches being used to over come this problem hybrid technology for exploitation of heterosis is considered desirable. The crop okra which categorized under often Cross-Pollinated group showed easy emasculation and number of seed production in one pollination. Therefore present investigation was carried out to estimate the magnitude of heterosis for fruit yield and its contributing characters in okra.

II. Materials And Methods

The experimental material comprised of 4 lines *Viz*., Arka Abhay (P1), Arka Anamika (P2), Parbani Kranti (P3), Varsha Uphar (P4) and 15 testers *Viz.,* IC-332453 (P5), IC-433640 (P6), IC-326893 (P7), IC-332454 (P8), IC-433672 (P9), IC-433670 (P10), IC-328942 (P11), IC-433690 (P12), IC-433673 (P13), IC-331026 (P14), IC-433695 (P15), IC-331067 (P16), IC-433675(P17), IC-433645(P18) and IC-331217 (P19). The testers were crossed with each line and thus 60 F1s were produced in Line x Tester mating design, Kempthorne (1957). The 19 parents and 60 F1s were grown in a randomized block design with 3 replications at the student farm Department of Horticulture, Acharya N.G.Ranga Agricultural University, Rajendra Nagar, Hyderabad during *Kharif* 2009 and spring-summer 2010. Row-to-row and plant-to-plant distances were maintained at 60cm and 30cm respectively. Observations were recorded on 5 randomly selected competitive plants for 13 characters. Average heterosis and heterobeltiosis was computed.

III. Results And Discussion

The analysis of variance indicated highly significant differences for all most all the characters suggesting presence of genetic variability (Table -1). The range of heterosis for the trait fruit yield per plant was -28.28 to 75.16 percent over mid parent and -30.11 to 72.94 percent over better parent, -12.16 to 9.79 percent and -15.91 to 4.88 percent for days of 50% flowering, -20.23 to 16.43 percent and -23.10 to 14.07 percent for days to maturity, -21.15 to 12.46 percent and -24.98 to 7.10 percent for node at which at the first flower appears, 149.48 to -79.32 percent and 106.46 to -80.85 percent for number of branches per plant, -25.86 to 56.30 percent for number of fruits for plant, -34.43 to 23.64 percent and -36.63 to 15.43 percent for length of fruit, -22.87 to 16.00 percent and -29.33 to 14.95 percent for diameter of the fruit, -14.20 to 38.35 percent and -28.18 to 38.17 percent for ten pods weight(g), -28.30 to 75.18 percent and -30.12 to 72.97 percent for fruit yield for plant, -100.00 to 179.80 percent and -100.00 to 48.54 percent for node at which mosaic disease appears, -100.00 to 300.00 percent and -100.00 to 100.00 percent for days to first mosaic symptom appears respectively.

Appreciable amount of heterosis and heterobeltiosis to the extent of 75.16 and 72.94 percent respectively was observed for fruit yield per plant. The cross Arka Anamika x IC-331217 exhibited maximum heterosis 75.16 percent and 72.94 percent over mid parent and over better parent respectively. 26 crosses over mid parent and 19 crosses over better

parent showed significant positive heterosis for number of fruits per plant. The extent of heterosis was relatively moderate as compared to result of Rewale *et al.* (2003), Sonia and Pritam (2001) , Singh and Mandal (1993).

Out of 60 hybrids 41 and 44 crosses had earliness than their better parent and mid parent respectively. The heterosis over mid parent and over better parent ranged from -12.16 to 9.79 percent and -15.91 to 4.88 percent respectively. Similar result reported by Pawar *et al* (1999) out of 60 crosses 42 and 46 showed significant heterosis over mid parent and better parent for days of maturity in the desired (Negative) direction. The Cross Arka Abhay x IC-331026 showed highest magnitude of negative heterosis over mid parent (-20.23%) and the cross Parbhani Kranthi x IC-433640 showed highest magnitude of negative heterobeltiosis over better parent (-23.10%). Rewale *et al*. (2003) reported significant negative heterosis for this character.

In case of plant height the cross Parbhani Kranthi x IC-433645 recorded high heterosis (44.74%) and heterobeltiosis (40.55%) for this character. For number of branches per plant the cross combination Varsha Uphar x IC-4336760 (106.46%) had high magnitude of heterosis over better parent for these trait. Similar results reported by Poshiya and shukla (1989), Ahmed *et al*. (1999) and Rewale *et al*. (2003).

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Table-1 Crosses showing high heterosis and heterbeltiosis for yield and its components in okr

Characters	P2 x P19		P2 x P7		P1 x P19		P1x P8		P2 x P10	
	MP	BP	MP	BP	MP	BP	MP	BP	MP	BP
Plant height	1.35	-2.33	-7.42	-12.48*	7.67	3.18	0.09	-1.95	21.93**	15.88**
Days to 50 % flowering	-9.02**	-15.91	-8.13**	-14.39**	-5.04*	-14.39**	4.68*	3.36	-1.95	-4.55*
Days to maturity	-14.98**	-19.94**	-18.83**	-20.00**	-16.11**	-20.81**	-5.53*	-5.77*	-13.83**	-14.55**
Node at which first flower appears	7.28	-4.82	-11.42**	-15.66**	-2.40	-13.88**	-0.62	-5.09	-4.69	-9.57*
Number of braches per plant	60.74**	58.93**	51.42**	34.10**	33.74**	22.08	18.82	16.70	-18.27	-34.68**
Number of fruits per plant	38.36**	34.22**	44.59**	39.68**	46.67**	41.96**	25.27**	21.13*	38.90*	32.32**
Length of the fruit	0.33	-8.61*	-8.25*	-11.20**	-9.95*	-13.20**	18.84**	8.82	-4.55	-15.99**
Diameter of the fruit	15.25**	14.66**	7.15*	4.93	6.81	3.87	5.94	2.63	-4.49	-12.50**
Ten pods weight	26.36**	23.98**	19.87**	18.88**	17.31**	14.75**	26.72**	22.20**	15.23**	7.90
Fruit yield per plant	75.16**	72.94**	74.35**	69.55**	73.61**	69.58**	65.53**	62.59**	60.53**	57.28**
Fruit yield per hectare	75.18**	72.97**	74.13**	69.35**	73.67**	69.63**	65.58**	62.66**	60.54**	57.28**
Node at which mosaic disease appear	-100.00**	-100.00**	-100.00**	-100.00**	-100.00**	-100.00**	-100.00**	-100.00**	-100.00**	-100.00**
Days at first mosaic symptom appear	-100.00**	-100.00**	-100.00**	-100.00**	-100.00**	-100.00**	-100.00**	-100.00**	-100.00**	-100.00**